

Solutions: Finding Probability of Events

Question 1

If you were answering this question with a random guess, the probability of getting the correct answer would be:

- ☐ (a) .20
- ☐ (b) .30
- ☐ (c) .50
- ☐ (d) .80
- ☐ (e) None of the above.

Select one answer.
10 points

Correct answer: (a)

Question 2

A fair die is rolled 12 times. Consider the following three possible outcomes:

(i)	5 2 6 3 2 1 4 1 6 5 3 4
(ii)	1 1 2 2 3 3 4 4 5 5 6 6
(iii)	6 6 6 6 6 6 6 6 6 6 6 6

Which of the following is true?

- ☐ (a) (i) is more likely than (ii) or (iii).
- ☐ (b) (ii) is more likely than (iii).
- ☐ (c) The three outcomes are equally likely.
- ☐ (d) It is absolutely *impossible* to get sequence (iii).
- ☐ (e) Both (a) and (b) are true.

Select one answer.
10 points

Correct answer: (c)

Question 3

Let A and B be two *disjoint* events such that $P(A) = .20$ and $P(B) = .60$. What is $P(A \text{ and } B)$?

- ☐ (a) 0
- ☐ (b) .12
- ☐ (c) .68
- ☐ (d) .80
- ☐ (e) None of the above.

Select one answer.
10 points

Correct answer: (a)

Question 4

Let A and B be two *disjoint* events such that $P(A) = .20$ and $P(B) = .60$. What is $P(A \text{ or } B)$?

- ☐ (a) 0
- ☐ (b) .12
- ☐ (c) .68
- ☐ (d) .80
- ☐ (e) None of the above.

Select one answer.
10 points

Correct answer: (d)

Question 5

In the population, 8% of males have had a kidney stone, while only 2% of females have had a kidney stone. Suppose a medical researcher randomly selects one male and one female from the population.

Let **A** represent the event "the selected *male* has had a kidney stone."

Let **B** represent the event "the selected *female* has had a kidney stone."

Which of the following is true about the two events?

- ☐ (a) A and B are disjoint.
- ☐ (b) A and B are independent.
- ☐ (c) A and B are complements.
- ☐ (d) All of the above are true.
- ☐ (e) Only (a) and (b) are true.
- ☐ (f) None of the above is true.

Select one answer.
10 points

Correct answer: (b)

The following three questions refer to the following information:

According to the information that comes with a certain prescription drug, when taking this drug, there is a 20% chance of experiencing nausea (N) and a 50% chance of experiencing decreased sexual drive (D). The information also states that there is a 15% chance of experiencing both side effects.

Question 6

What is the probability of experiencing nausea *or* a decrease in sexual drive?

- ☐ (a) .10
- ☐ (b) .40
- ☐ (c) .55
- ☐ (d) .70
- ☐ (e) .85

Select one answer.
10 points

Correct answer: (c)

Question 7

What is the probability of experiencing exactly one of the two side effects? (A probability table could be useful.)

- ☐ (a) .10
- ☐ (b) .40
- ☐ (c) .55
- ☐ (d) .70
- ☐ (e) .85

Select one answer.
10 points

Correct answer: (b)

Question 8

What is the probability of experiencing neither of the side effects?

- ☐ (a) .10
- ☐ (b) .40
- ☐ (c) .45
- ☐ (d) .70
- ☐ (e) .85

Select one answer.
10 points

Correct answer: (c)

The next two questions refer to the following information:

For safety reasons, four different alarm systems were installed in the vault containing the safety deposit boxes at a Beverly Hills bank. Each of the four systems detects theft with a probability of .99 *independently* of the others.

Question 9

What is the probability that when a theft occurs, *all four* systems will detect it?

- ☐ (a) $(.99)^4$
- ☐ (b) $(.99) * 4$
- ☐ (c) $(.01)^4$
- ☐ (d) $(.01) * 4$
- ☐ (e) None of the above.

Select one answer.
10 points

Correct answer: (a)

Question 10

The bank, obviously, is interested in the probability that when a theft occurs, *at least one* of the four systems will detect it. This probability is equal to:

- ☐ (a) $(.99)^4$
- ☐ (b) $(.01)^4$
- ☐ (c) $1 - (.99)^4$
- ☐ (d) $1 - (.01)^4$
- ☐ (e) $1 - (.01)^4$

Select one answer.
10 points

Correct answer: (d)

Question 11

A coin is tossed three times, or until the first "heads" appears, whichever occurs first. Which of the following is the sample space for this random experiment?

- ☐ (a) $S = \{HHH, HHT, HTH, THH, HTT, THT, TTH, TTT\}$
- ☐ (b) $S = \{H, TH, TTH\}$
- ☐ (c) $S = \{H, TH, TTH, TTT\}$
- ☐ (d) $S = \{H, HH, HHH\}$
- ☐ (e) $S = \{H, HT, HHT, HHH\}$

Select one answer.
10 points

Correct answer: (c)

Question 12

Only 40% of the students in a certain liberal arts college are males. If two students from this college are selected at random, what is the probability that they are of the same gender?

- ☐ (a) .96
- ☐ (b) .52
- ☐ (c) .48
- ☐ (d) .36
- ☐ (e) .16

Select one answer.
10 points

Correct answer: (b)